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AUTHORITY

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SEVENTH PROGRESS REPORT (SUMMARY)

1 October 1965 - 31 December 1965

ARMY BIOLOGICAL LABORATORIES

Contract AMC-18-064-93-63

Metabolism of rickettsiae and related microorganisms

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1. Metabolic activity of Rickettsia quintana (K. Huang and E. Weiss).

The pathway of glutamine utilization was investigated by thin layer chromatography. The accumulation of intermediates of the citric acid cycle from α-ketoglutarate to malate was demonstrated by incubating the microorganisms with small amounts of glutamine, labeled with ^{14}C to a high degree of specificity, and large amounts of unlabeled intermediates. It was not possible, however, to demonstrate the accumulation of oxaloacetate or the tricarboxylic acids. The latter results can be attributed to the instability of oxaloacetate and the impermeability of the microorganisms to citrate.

2. Metabolic activity of Rickettsia rickettsi (E. Weiss and H. D. Rees, Jr.)

The rate of utilization of glutamate is approximately linear for a period of two hours. Pyruvate is metabolized with production of about one-third as much CO_2 as from glutamate. One-half of the CO_2 is derived from carbon 1 and one-fourth from each of the other two carbons of pyruvate. Light and electron microscopy indicated that the preparations used in these experiments were free from obvious contamination with host material.

3. A study of the DNA of Rickettsia quintana (R. A. Mason and E. Weiss).

In an experiment with pyruvate, agar medium appeared to be more satisfactory than the corresponding liquid medium for the demonstration of incorporation of this metabolite into large molecules. Thus, a further attempt to label DNA with cytidine-^3H was carried out on agar, but no evidence of incorporation was obtained. A satisfactory method was developed for the separation of nucleotides by thin layer chromatography. For the success of the method it was essential to carry out enzymatic hydrolysis of the DNA in low salt concentration.